complete

INSTRUCTIONS

AMECO TRANSMITTER KIT

MODELS AC-1 AND AC-1T

Check the parts in the kit with the Parts List. Should inspection reveal a missing part, notify the factory in writing. A slight difference in value between the actual part and the Parts List does not mean that you have the wrong part. For instance, the kit may have a 67,000 ohm resistor, while the Parts List calls for a 68,000 ohm resistor. Both parts will work equally well.

PARTS LIST

PART NO.	QUANTITY	SYMBOL NO.	DESCRIPTION
		CAPACITORS	
1516 2008 002	1	C1	20 uF, 450 v, electrolytic
8900 7911 010	1	C2	400 pF, variable
1569 9003 004	1	C3	900 pF, variable
8900 8100 170	3	C4 thru C6	.001 uF, 500 v, +80%, -20%, disc
8900 8100 130	1	C7	220 uF, molded mica
8900 8100 170	1	C8	.001 uF, 500 v, +80%, -20%, disc
8900 8100 100	1	C9	22 pF, ±5%, NPO, disc
		RESISTORS	
8900 8459 140	1	R1	100 k, ±20%, 2 watt
8900 8400 240	1	R2	15 k, ±20%, 1 watt
8900 8400 130	1	R3	47 k, ±20%, 1/2 watt
		TUBES	
8900 9711 010	1	V1	6V6GT
8900 9711 020	1	V2	6X5GT

PART NO.	QUANTITY	SYMBOL NO.	DESCRIPTION
		MISCELLANEOUS	
8900 8800 060	1	J1	Socket octal, black
8900 8611 010	1	L2	RF choke, 2.5 mh
8900 8611 010	1	L3	RF choke, 2.5 mh
8900 8611 010	1	L4	RF choke, 2.5 mh
8900 9160 010	1	P1	Plug, and line cord
8900 8700 010	1	S1	SPST slide switch, black
8900 7511 010	1	T1	Power transformer
8900 9200 020	1	TB1	Terminal strip, 2 screw
8900 9200 130	1	TS1	Terminal strip, 3 lug, 3AHA
8900 8800 060	1	XV1	Socket, octal, black
8900 8800 060	1	XV2	Socket, octal, black
8900 8811 010	1	XL1	Socket, 5 prong
8900 9400 050	1		Coil form, 5 prong (part of L1)
8900 9100 060	14 ft.		#22 wire (part of L1)
8900 9500 020	1		Rubber grommet
8900 9500 030	4		Rubber feet
8900 9600 060	10		Screw, 6-32 x 1/4
2851 0408 311	2		Screw, 4-40 x 1/4
8900 9600 220	10		Nut 6-32 x 1/4
8900 9600 200	2		Nut, 4-40 x 3/16
8900 9600 320	16		Lockwashers, #6
8900 9600 330	4		Lockwashers, #8
	2 ft.		Wire, #20, insulated hook-up
1408 1603 011	2		Spacer, AC-1
	1 ft.		Wire, #20, bare tinned copper
8900 9600 040	5		Machine Screw, 6-32 x 3/8
2831 0811 611	4		Hex Nut, 8-32

WARNING

ANY AMECO PRODUCT THAT HAS BEEN ASSEMBLED USING ACID CORE SOLDER, PASTE OR LIQUID FLUX WILL NOT BE SERVICED AT ANY TIME, NOR WILL SUCH PRODUCT OR EQUIPMENT BE CONSIDERED TO BE COVERED BY ANY WARRANTY OR GUARANTEE ISSUED BY THIS COMPANY.

SOLDERING

Use a good grade of Rosin Core Solder, 60-40 alloy, and a soldering iron in the 50 to 100 watt range. Do not use a soldering gun as it does not develop enough heat for chassis connections. The tip of the soldering iron must be clean and properly tinned. To tin an iron, allow the new iron to heat and apply rosin core solder to the tip faces. Wipe away the excess solder with a soft cloth leaving a bright smooth face. As the iron is used, you will find it necessary to periodically clean the tip by filing down to bare copper and re-tinning. You cannot make a satisfactory joint with a pitted or dirty iron.

Wrap or crimp the wire to the terminal to be soldered and make a good mechanical connection. Solder is not a glue, do not depend on it to hold everything together. Bring the hot iron tip to the joint to be made and hold one face of the tip against the joint. With the iron in place, apply a small amount of solder to the joint and the tip of the iron. A large blob of solder does not make a good joint and may cause trouble later. Use the solder sparingly. When the solder and joint reach a high enough temperature, the solder will appear to run or flow. This is especially important when making chassis connections. In soldering to the chassis, you will note that the solder, when first applied, will form a small raised bubble. Continue to apply heat until the edges of the bubble suddenly spread and flow over the adjacent metal and the spot flattens out. If you fail to do this, your chassis will not be mechanically or electrically sound.

FOLLOW INSTRUCTIONS CAREFULLY. DOUBLE CHECK FREQUENTLY AND DO NOT ATTEMPT SHORT CUTS. THE INSTRUCTIONS HAVE BEEN WRITTEN TO HELP YOU TO COMPLETE THE KIT IN THE SHORTEST TIME WITH THE LEAST DIFFICULTY.

STEP-BY-STEP ASSEMBLY

1. Scrape paint from a 1/8" area around the mounting holes of the transformer, the variable capacitors and the sockets.
2. Mount J1, an 8 pin octal socket, in the position indicated in Figure 1. The key (slot) in the socket should be positioned exactly as shown. Use a 6-32 x 1/4 screw, a #6 lockwasher and a 6-32 nut for each mounting hole. Insert the screw into the top of the chassis and the lockwasher between the socket and the nut.
3. Mount XV1, an 8 pin octal socket, in the position shown in Figure 1. Use hardware and mounting procedure as in Step 2. Note the position of the key of the socket.
4. Mount XV2, an 8 pin octal socket, in the position shown in Figure 1. The key (slot) should be positioned exactly as shown. Use hardware and mounting procedure as in Step 2 except on the screw nearest the power transformer; after the lockwasher is in place, mount the three lug terminal strip, TS1, then a lockwasher and a nut. Be sure the terminal strip is in the position shown in Figure 1 after tightening the nut.
5. Mount XL1, a 5 prong socket, in the position shown in Figure 1. Use hardware and mounting procedure as in Step 2. Socket XL1 does not have a key but can be mounted correctly by observing the position of the five terminals in Figure 1.
6. Mount TB1, a 2-screw terminal strip, in the position shown in Figure 1. TB1 is mounted on top of the chassis. Use hardware as in Step 2. Place the lockwasher between the chassis and the nut. The solder lugs of the terminal strip face the center of the chassis.
7. Mount T1, the power transformer, in the position shown in Figure 1. Note that the two black transformer leads are near J1, towards the front panel. Fasten T1 in place with 4 #8 lockwashers and 4 #8-32 nuts.

NOTE

If the 4 screws in the transformer will not go into the holes in the chassis, loosen the nuts on the 4 screws, mount the transformer on the chassis using a lockwasher and nut on each screw. Do not tighten these nuts. Tighten the screws on the transformer to tighten the transformer nuts. Then use a socket wrench to tighten the mounting nuts.

8. Place the rubber grommet in the 3/8" hole at the rear of the chassis.
9. Take the two variable capacitors and turn their shafts so that the plates are fully meshed. To protect the capacitor plates from damage keep them meshed while building the transmitter. Mount the single section capacitor, C2, in the PLATE TUNING position. Place the spacer between the chassis and the capacitor, put a lockwasher on one of the 3/8" long 6-32 screws and put it through the chassis, spacer and into the capacitor. Do not tighten. Put the second screw in the same way, then hold the capacitor parallel to the chassis front while tightening the two screws. Mount the two section capacitor, C3, the same way, using three screws, lockwashers and a spacer.
10. Mount S1, the slide switch, in the position indicated in Figure 2. Position the slide switch so the two solder lug terminals are near the top of the chassis. Use two 4-40 x 1/4 screws, two #4 lockwashers and two 4-40 nuts in the manner described in Step 2.
11. Insert the 4 rubber feet into the holes in the bottom of the chassis. They go in easily if wet with water and inserted with a twisting motion.
12. Check your work thoroughly and then go on to the wiring instructions.

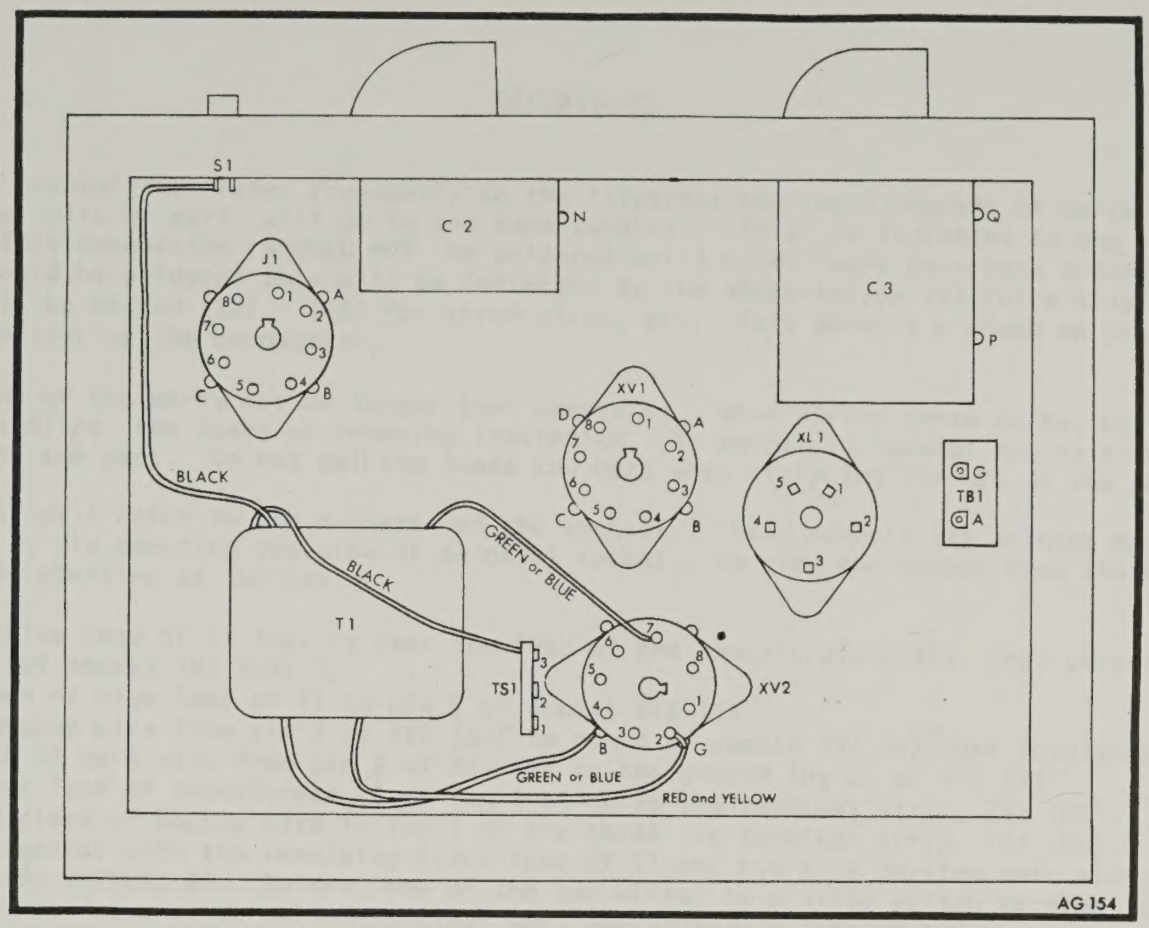


FIGURE 1: OUTLINE DRAWING - BOTTOM VIEW

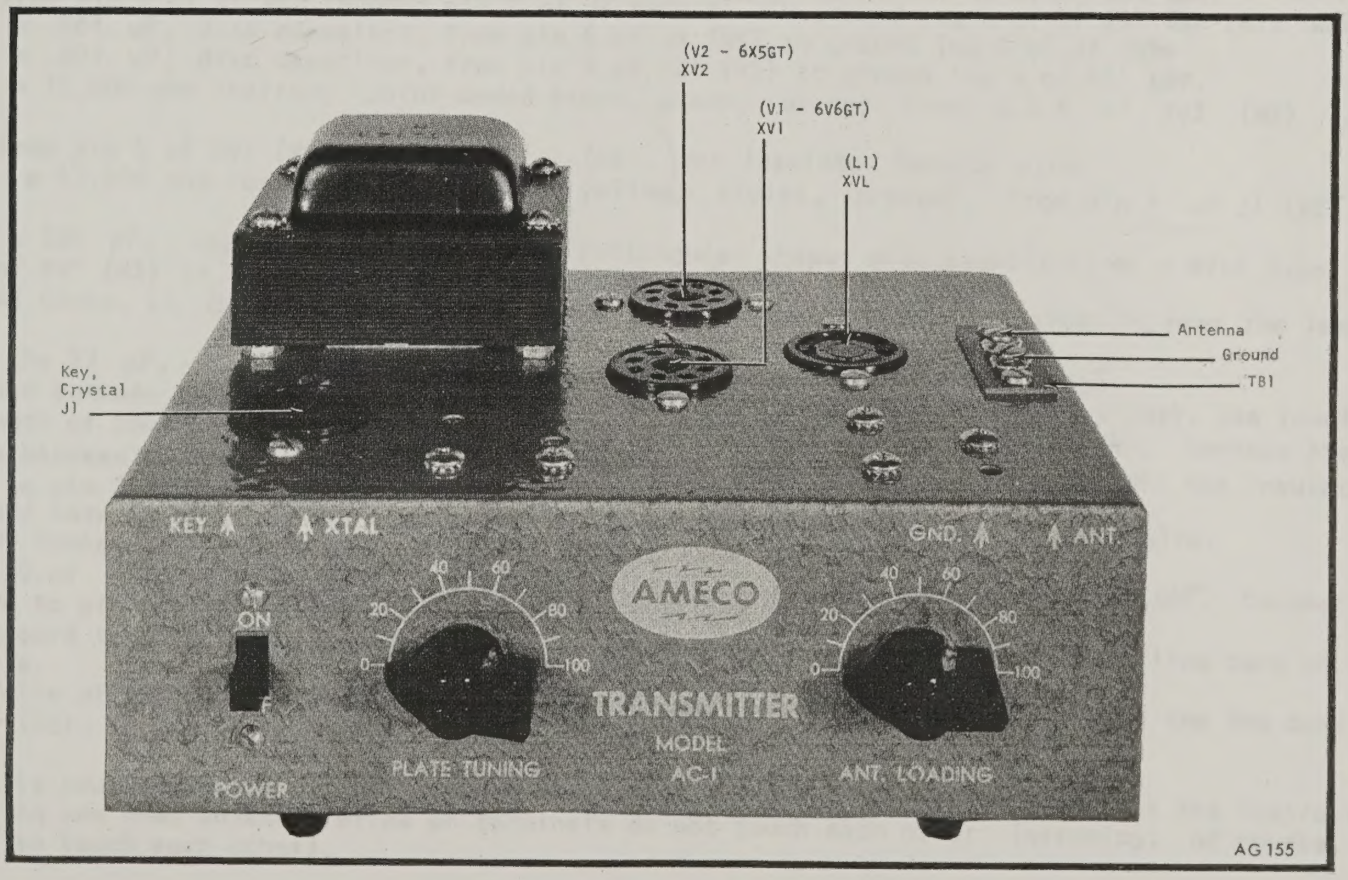


FIGURE 2: TOP VIEW

WIRING

When wiring the transmitter, refer frequently to the illustrations for placement of parts and leads. In some cases, more than one wire or part will go to the same terminal. This is indicated in the instructions by the abbreviation (NS). This connection SHOULD NOT be soldered until other leads have been connected to the terminal. When a connection should be soldered this will be indicated by the abbreviation (S) for a single wire. When there are two wires, it will be marked (S2), (S3) for three wires, etc. This permits a check on possible wiring errors or omissions before soldering the connection.

The leads on some of the parts may be longer than necessary. When wiring these parts, cut the leads to their proper lengths. In cutting the leads or removing insulation, be extremely careful not to nick or cut the copper wire that remains with the part. Do not pull the leads too hard when stripping the wire as the part may be damaged.

The instructions will refer to pin numbers of the sockets. These numbers are printed on the socket and are also shown in Figure 3. In counting the pins of an octal socket, we view the socket from the bottom and count in a clockwise direction, starting at the key.

- Run the green or blue lead of T1 that is near the rear of the chassis along the rear corner of the chassis to the ground lug B, of socket XV2 ~~(NS)~~. S
- Run the other green or blue lead of T1 to pin 7 of socket XV2 (NS).
- Run a length of hookup wire from pin 7 of XV2 ~~(S2)~~ to pin 2 of socket XV1 ~~(S)~~. Use insulated wire
- Run a small length of bare wire from pin 7 of XV1 ~~(S)~~ to the ground lug D, of XV1 ~~(S)~~.
- Run the short black lead of transformer T1 to lug 3 of three lug terminal strip, TS1 (NS).
- Connect a 10 inch piece of hookup wire to lug 1 of the three lug terminal strip, TS1 (NS). Twist this piece of hookup wire together with the remaining black lead of T1 and run this twisted pair along the corner of the chassis to the slide switch, S1. Solder one of the two wires to a slide switch terminal ~~(S)~~ and solder the other wire to the remaining slide switch terminal ~~(S)~~. Use insulated hook-up wire.
- Run the red and yellow striped lead of T1 thru point G of XV2 ~~(S)~~ to pin 2 of XV2 (NS).
- Twist together the two red leads of T1 and run one of them to pin 3 of XV2 ~~(S)~~. Run the other red lead to pin 5 of XV2 ~~(S)~~.
- Run a lead from pin 8 of XV2 (NS) to pin 6 of XV2 (NS). Use insulated hook-up wire.
- Connect R1, a 100,000 ohm resistor (color coded brown, black, yellow) from pin 8 of XV2 (NS) to pin 2 of XV2 ~~(S2)~~.
- Run a lead from terminal G of TB1 (NS) to the nearest hole in the frame of C3 ~~(S)~~. Use bare hook-up wire.
- Connect one of the RF chokes, L2, from pin 8 of XV2 (S3) to pin 3 of XV1 (NS).
- Connect C4, a .001 uF, disc capacitor, from pin 3 of XV1 ~~(S2)~~ to pin 4 of the 5 prong socket, XL1 (NS).
- Connect C5, a .001 uF, disc capacitor, from pin 6 of XV2 (NS) to ground lug C, of XV1 ~~(S)~~.
- Run a lead from pin 8 of J1 ~~(S)~~ THROUGH pin 2 of J1 (NS) to the ground lug A of J1 ~~(S)~~. Use bare hook-up wire.
- Connect C8, a .001 uF, disc capacitor, from pin 6 of J1 (NS) to ground lug C of J1 ~~(S)~~.
- Connect C6, a .001 uF, disc capacitor, from pin 4 of XV1 (NS) to ground lug B of XV1 ~~(S)~~.
- Connect R2, a 15,000 ohm resistor (color coded brown, green, orange from pin 6 of XV2 (NS) to pin 4 of XV1 (S2).
- Run a lead from pin 5 of XV1 (NS) to pin 4 of J1 (NS). Use insulated hook-up wire.
- Connect R3, a 47,000 ohm resistor (color coded yellow, violet, orange), from pin 4 of J1 ~~(S2)~~ to pin 2 of J1 ~~(S2)~~.
- Connect C7, a 220 pF, capacitor (this may be a rectangular shaped mica capacitor, or a disc type capacitor) from pin 8 of XV1 (NS) to the ground lug, A of XV1 ~~(S)~~.
- Connect an RF Choke, L3, (NS) from pin 8 of XV1 (NS) to pin 6 of J1 ~~(S2)~~. Put sleeving over the lead from the choke to J1.
- Connect C9, the 22 pF, disc capacitor, from pin 5 of XV1 ~~(S2)~~ to pin 8 of XV1 ~~(S3)~~.
- Connect a lead between terminal N of the variable capacitor, C2 ~~(S)~~ and pin 4 of XL1 ~~(S2)~~. Use insulated wire.
- Cut a 4" length of hook-up wire and strip the insulation from one end for about 1-1/4". Connect the bare section of wire between terminals P (S) and Q (S) of variable capacitor C3 (S), then connect the insulated section of the lead to pin 2 of XL 1 (NS).
- Connect a lead between pin 2 of XL1 ~~(S2)~~ and terminal A of TB1 (NS). Use bare hook-up wire.
- Connect an RF Choke, L4, from terminal G of TB1 ~~(S2)~~ to terminal A of TB1 ~~(S2)~~.
- Connect the 20 mf electrolytic capacitor, C1, negative (-) wire to ground lug B of J1 ~~(S)~~. Connect the positive (+) wire to pin 6 of XV2 ~~(S4)~~.
- Put the line cord through the grommet at the rear of the chassis and tie a knot in the line cord on the inside of the chassis.
- Connect one wire of the line cord to terminal 1 of TS1 (S2). Connect the other wire of the line cord to terminal 3 of TS1 (S2).

The chassis is now completely wired. Go over the wiring and check it carefully against the instructions and diagrams. Check to see that adjacent wires or terminals do not touch each other (assuming, of course, that they are not supposed to touch each other).

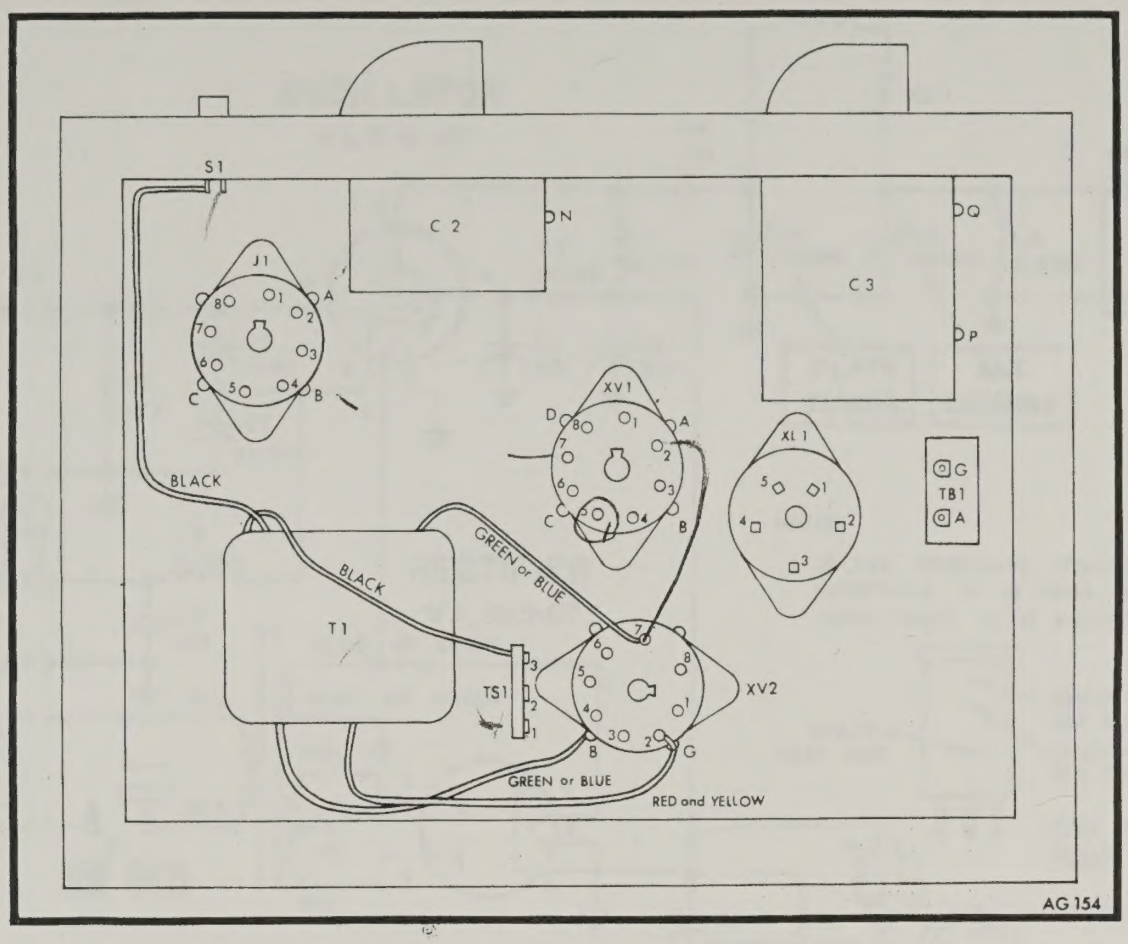


FIGURE 3: OUTLINE DRAWING - BOTTOM VIEW

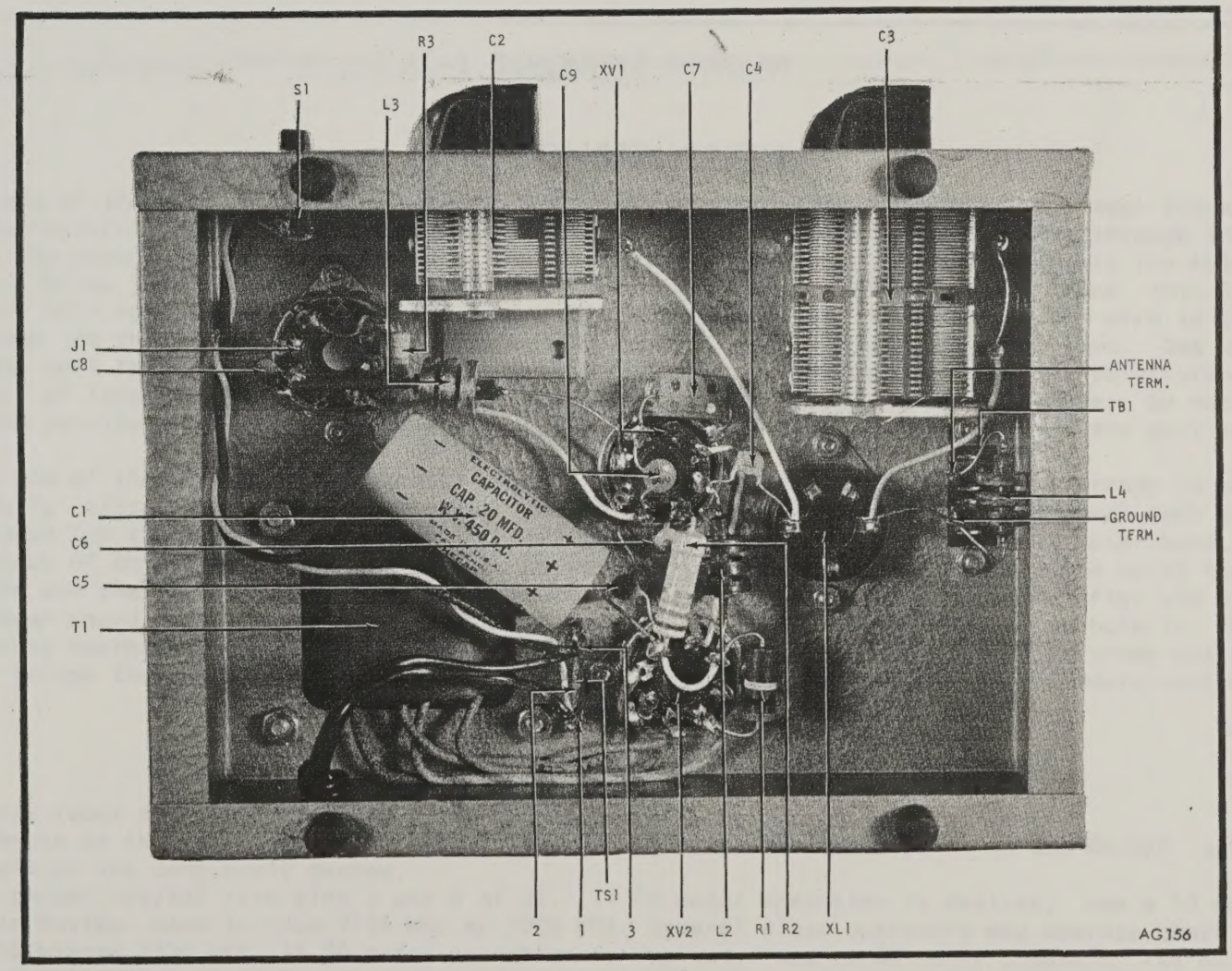
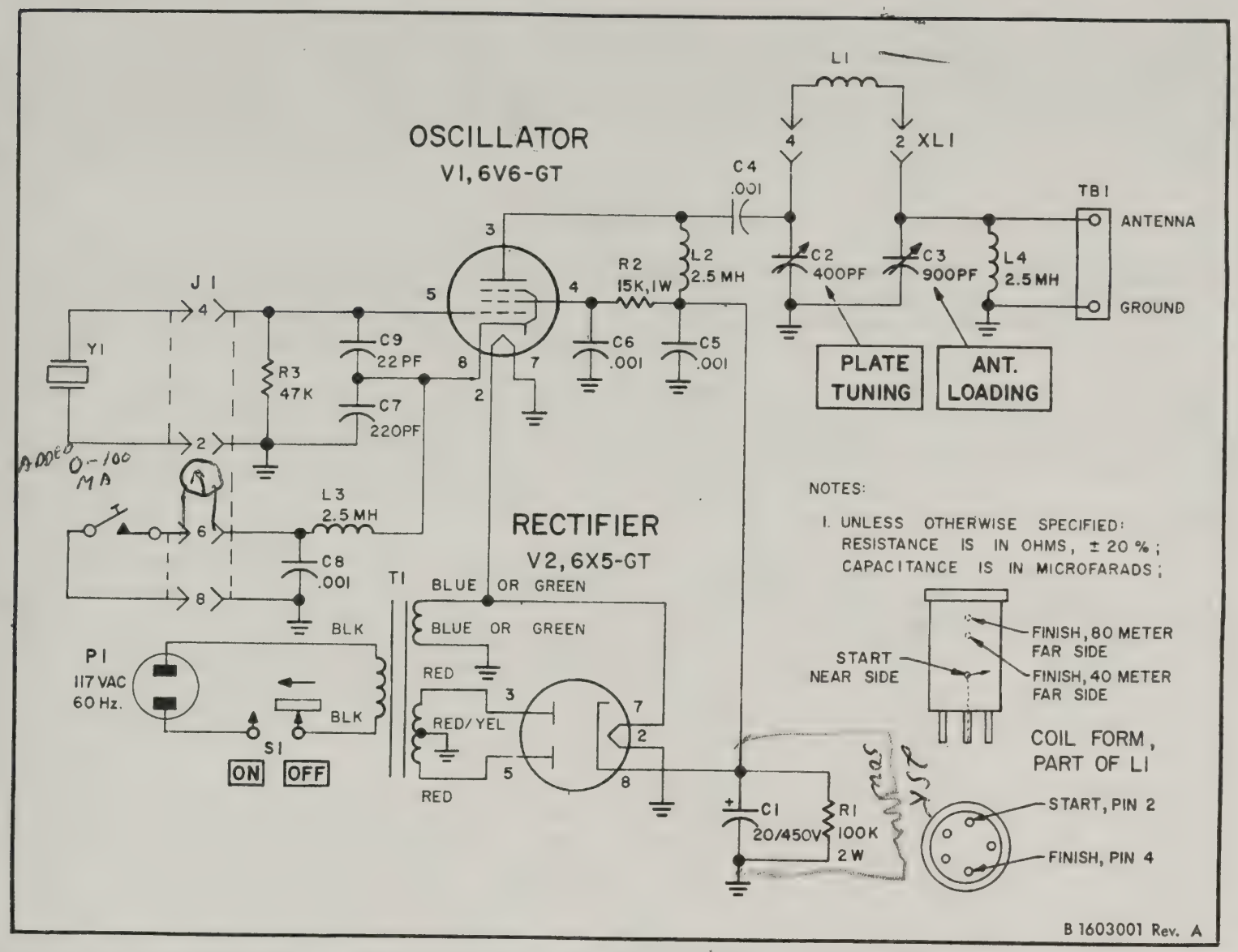


FIGURE 4: BOTTOM VIEW

25K BLEEDER? 50 WATTS



COIL CONSTRUCTION

Take one end of the coil wire and scrape off about 3/4" of insulation. Use a knife, razor blade or sandpaper to do this. Be careful not to nick or weaken the wire. Pass the bare end of the wire through the hole in the coil form near the prongs. Then pass the wire into the inside of the prong directly beneath the hole (prong 2 of the coil form). Allow 3/8" of the bare wire to protrude from the bottom of the prong. Bend this 3/8" piece of wire so the wire will not slip out. Using a clean, well tinned soldering iron, solder the wire to the prong. Do not keep the iron on the prong too long or the heat will soften the polystyrene coil form. One way to prevent over heating the coil form is to hold the prong midway between the soldering point and the polystyrene base of the coil with a pair of long nose pliers. The pliers will conduct heat away from the coil base. Do not allow solder to remain on the outside of the prong as this will make it difficult to plug the coil into the coil socket.

After the end of the wire has been carefully soldered to the coil prong, the coil is ready to be wound. The coil is carefully close-wound toward the top of the coil form. The turns of the coil touch each other. If the coil is to be used for the 40 meter band, wind 15-1/2 turns. If the coil is for the 80 meter band, wind 28-1/2 turns. Keep track of the turns as the coil is being wound. The 40 meter coil should end up at the middle hole of the coil form and the 80 meter coil should terminate at the top hole of the coil form. After the correct number of turns have been wound, cut the coil wire, allowing enough wire to be passed through the hole in the coil form and into the prong nearest the hole (prong 4). Also allow for an extra 1/2" of wire to protrude out of the bottom of the prong. Scrape the end of the wire clean and solder it to the prong, using the procedure outlined above.

OPERATION

1. Place the two tubes and the correct coil in their sockets.
2. Place the knobs on the variable capacitors in such a way that the knobs point to the ON/OFF switch when the capacitor plates are completely meshed.
3. Insert the proper crystal into pins 2 and 4 of J1. If 40 meter operation is desired, use a 40 meter crystal. The 40 meter Novice band is from 7150 kHz to 7200 kHz. General class operators may operate their transmitters between 7000 kHz and 7300 kHz. If 80 meter operation is desired, use an 80 meter crystal. The 80 meter Novice band is from 3700 kHz to 3750 kHz. General class operators may operate their transmitters between 3500 kHz and 4000 kHz. Crystals in FT243 holders are stocked by all distributors of amateur equipment.
4. Using a Mosely 301 or Millen 37412 plug, insert the key leads into pins 6 and 8 of J1, with the frame of the key connected to contact #8 in J1.

5. Obtain a 115 volt, low wattage bulb (7-1/2 to 15 watts) and connect it between the Antenna and Ground terminals of the transmitter. To make it easy to connect the bulb to the Antenna and Ground terminals, solder a piece of wire to the terminal in the base of the bulb and another piece of wire to the screw shell portion of the bulb. Connect the other ends to terminal board TB1. The bulb is called the dummy load, and it takes the place of the antenna during testing periods.

WARNING

HIGH VOLTAGES PRESENT IN THE TRANSMITTER ARE DANGEROUS. THE TRANSMITTER SHOULD BE TURNED OFF BEFORE ADJUSTING OR TOUCHING ANYTHING ON THE INSIDE OF THE TRANSMITTER. ALWAYS DISCHARGE THE FILTER CAPACITOR, C1, AFTER THE TRANSMITTER HAS BEEN TURNED OFF BY SHORTING B+ TO GROUND WITH A SCREWDRIVER THAT HAS AN INSULATED HANDLE.

6. GROUNDING: Before proceeding further, it is important to ground the transmitter chassis. This is not only a safety precaution, it helps minimize television interference and insure efficient antenna loading. The chassis is grounded by connecting the ground terminal to a cold water pipe or to a radiator. The connecting wire should be a heavy gauge copper or aluminum ground wire. It should be as short as possible. Be sure that good electrical contact is made between the wire and the water pipe or radiator.
7. Connect the power cord plug to a 115 volt AC source and turn the power switch on. After a few seconds, the tubes will warm up and glow.
8. Completely mesh both variable condensers (the knobs should be pointing toward the switch).
9. Close the telegraph key and turn the PLATE TUNING control until the dummy load bulb lights up. Adjust the PLATE TUNING control for maximum brilliance of the bulb. Turn the ANTENNA LOADING control slightly clockwise. Then readjust the PLATE TUNING control for maximum brilliance of the bulb. Again turn the ANTENNA LOADING control slightly clockwise and readjust the PLATE TUNING control for maximum brilliance. Continue this procedure until the point of maximum brilliance is reached. At this point, the transmitter is delivering the maximum RF power to the dummy load. If a receiver is tuned to the frequency of the transmitter, the signal of the transmitter will be picked up by the receiver. The signal in the receiver will be loudest when the bulb shows maximum brilliance.
10. Another way to tune up the transmitter is to use a 0-100 ma, dc meter. The milliampmeter is inserted in series with the key. After both tuning capacitors have been meshed completely, rotate the PLATE TUNING control until there is a "dip" or minimum reading of the meter. The ANTENNA LOADING control is then rotated slightly clockwise. There will be a slight increase in the meter reading. This indicates the transmitter is delivering more power to the lamp bulb. Readjust the PLATE TUNING control for a dip in the meter reading. Again adjust the ANTENNA LOADING control slightly clockwise and note the increase in plate current. Readjust the PLATE TUNING control for a dip in the meter. Continue this procedure until the dip reading is maximum - that is, the meter shows the highest current and yet increases when the PLATE TUNING control is rotated slightly in either direction. Note that the dip is sharpest when the ANTENNA LOADING capacitor is fully meshed. As the capacitor is opened, the transmitter is loaded and the dip becomes shallower. In tuning up the transmitter with either of the above methods, the PLATE TUNING control should be the last adjustment before operating.

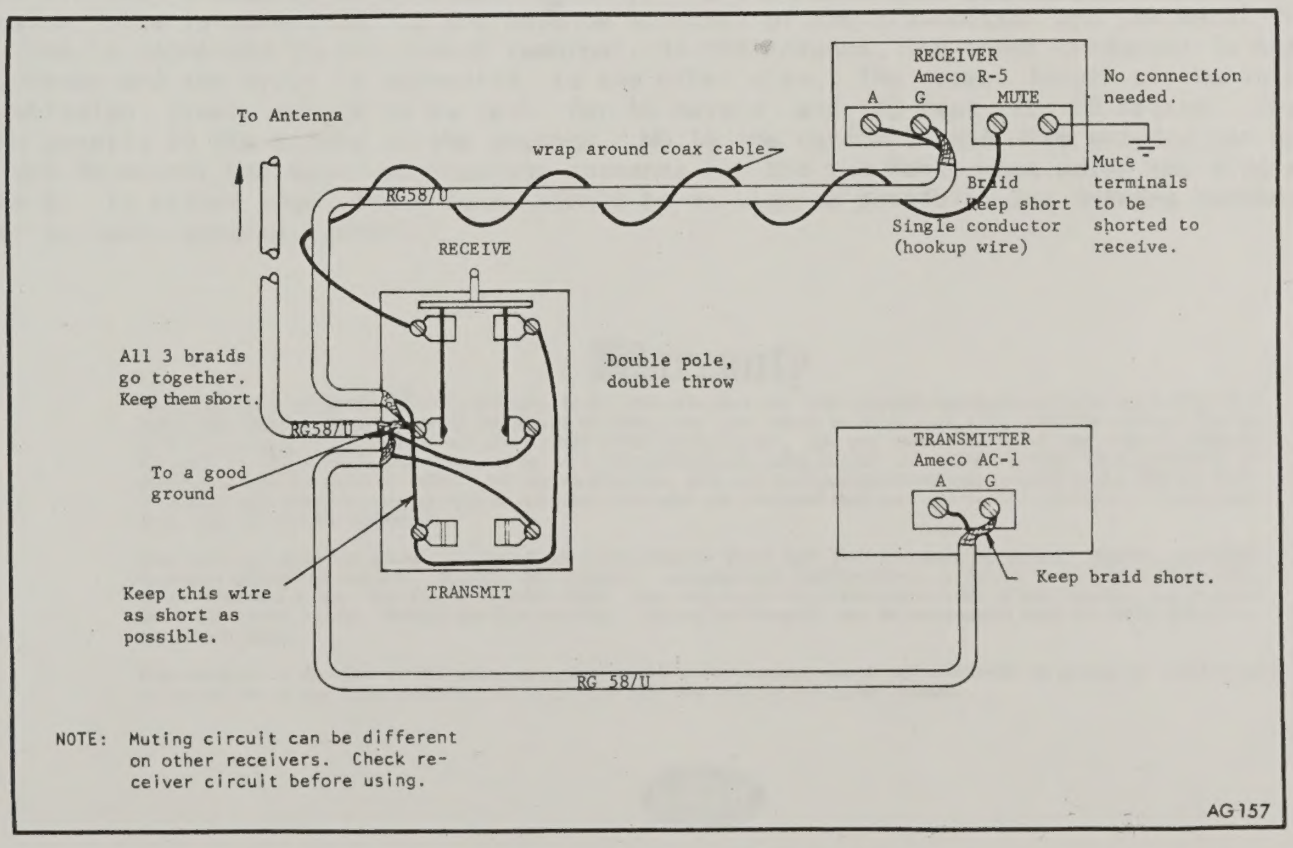
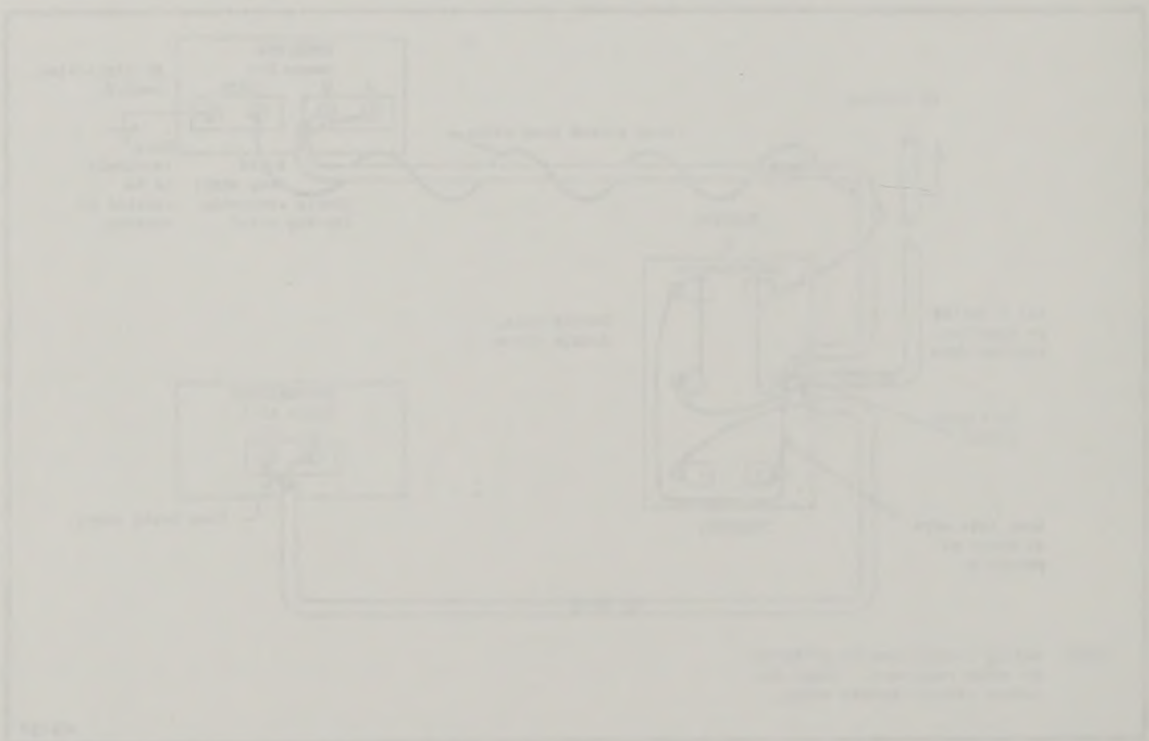


FIGURE 5: INTERCONNECTIONS BETWEEN TRANSMITTER, RECEIVER AND ANTENNA, USING DOUBLE POLE--DOUBLE THROW (DPDT) SWITCH FOR TRANSMIT-RECEIVE SWITCHING.



OPERATION WITH ANTENNA

11. The simplest type of antenna to use with this transmitter for both 40 and 80 meters is a random length of wire. Although the transmitter will load into almost any length of wire, it will load best into 67 feet of wire (as measured from the antenna terminal of the transmitter to the end of the wire). Size #14 copper wire is ideal for antenna use. The antenna SHOULD BE AS HIGH AS POSSIBLE and should be kept clear of trees, power lines, buildings, etc. One end of the antenna should be connected to the antenna terminal of the transmitter and should be suspended from some high objects with insulators.
12. The transmitter with the random length of antenna wire can be tuned up with a 0 to 100 ma, dc milliampmeter, using the procedure given above. If a meter is not available, the following tuning method may be used: Obtain a 2 volt, .06 ampere flashlight bulb (either #48 or #49) and two pieces of wire, each one about two feet long. Connect the bulb between the two pieces of wire, one lead to the tip of the bulb base and the other lead to the shell of the bulb base. You now have a four foot length of wire with the bulb in the center. Connect one end of the wire to the output (Antenna) terminal of the transmitter. The other end is clipped to the antenna about three or four feet up from the Antenna terminal. If the antenna wire is insulated at this point, clean off the insulation before clipping the indicator wire to it. Turn the transmitter on and tune both tuning capacitors for maximum brilliance of the bulb. Use the same procedure that was used in tuning the transmitter with the dummy load lamp. This tuning system is ideal since it is an indication of what is going into the antenna. The bulb and four foot length of wire can be left on while operating the transmitter. It is a simple form of monitor and it will indicate that the transmitter is operating properly.

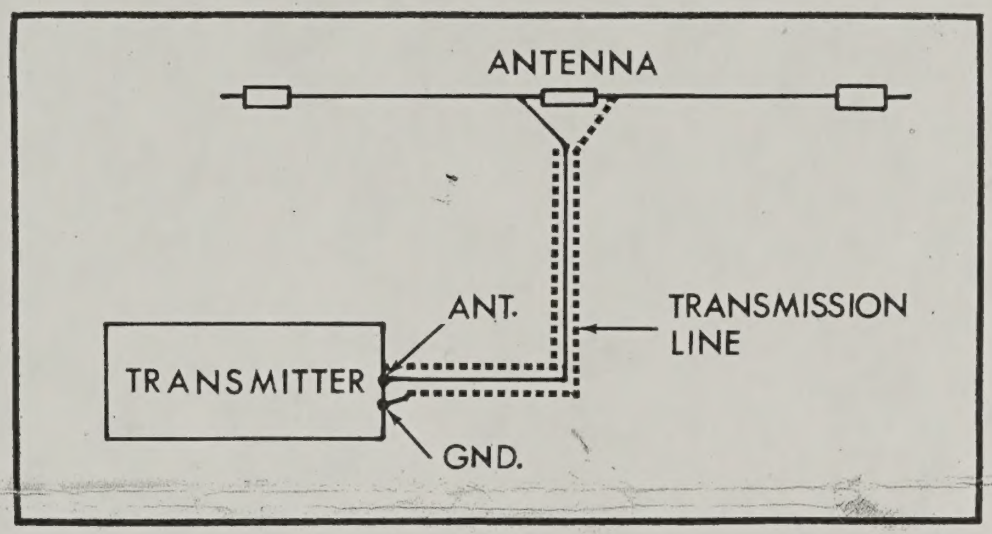


FIGURE 6: HALF-WAVE DIPOLE ANTENNA

13. Another type of antenna that can be used with this transmitter is the Half-Wave dipole antenna. This is shown in Figure 6. The transmission line can be #RG-59U and it can be of any length. The inner conductor of the transmission line is connected to the Antenna terminal of the transmitter and the metal braid of the transmission line is connected to the Ground terminal. At the antenna, the inner conductor is connected to one side of the antenna and the braid is connected to the other side. The total length of the antenna (not including the transmission line) should be 65 feet for 40 meters and 125 feet for 80 meters. The center insulator should be exactly in the middle of the antenna. While the random length wire antenna can operate properly for both 40 and 80 meters, you must use separate antennas for the two bands when using the dipole type of antenna of Figure 6. In either case, the antenna should be as high as possible. See Antenna Handbook or AARL Handbook for other suitable antenna systems.

Warranty

AMECO, Division of AEROTRON, INC., Raleigh, N. C., warrants each new radio product manufactured by it to be free from defective material and workmanship and agrees to remedy any such defect or to furnish a new part, in exchange for any part of any unit of its manufacture which under normal installation, use and service disclosed such defect, provided the unit is delivered by the owner to us or to our authorized radio dealer or wholesaler from whom purchased, or authorized service station, intact, for our examination, with all transportation charges prepaid to our factory, within ninety days from the date of sale to original purchaser and provided that such examination discloses, in our judgment, that it is thus defective.

This warranty does not extend to any of our radio products which have been subjected to misuse, neglect, accident, incorrect wiring not our own, improper installation, unauthorized modifications, or to use in violation of instructions furnished by us, nor extend to units which have been repaired or altered outside of our factory, nor to cases where the serial number thereof has been removed, defaced or changed, nor to accessories used therewith not of our own manufacture.

This warranty is in lieu of all other warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our radio products.

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